SUBMISSION DOCUMENT
CORE EVIDENCE BASE
Transport and Utilities Baseline Review

Improving the quality of life for everyone living and working in the Borough

November 2006
Transport and Utilities Baseline Review: Introductory Note

The Transport and Utilities Baseline Review report was prepared by EDAW in January 2005.

The findings relating to utilities have been used to generally inform policies within the Core Strategy, Area Action Plans and Development Control policies.

The findings relating to transport have now been superseded by the Buro Happold report, completed in 2006, entitled *Tower Hamlets Local Development Framework: Public Transport Study*.

London Borough of Tower Hamlets Area Action Frameworks

TRANSPORT AND UTILITIES BASELINE REVIEW

FIRST DRAFT

20TH JANUARY 2005
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executive summary

The Transport and Utility Infrastructure are key components that are required to enable development and regeneration of an area to occur. This report establishes the current baseline situation in terms of current infrastructure capacity. It also reviews potential and committed schemes to ascertain likely future capacities and makes recommendations where shortfalls have been identified.

TRANSPORT

Transport and general movement capacity is one of the biggest issues confronting future growth and economic vitality of urban areas. Road networks are generally operating at and, in some cases, beyond capacity during morning and evening commuter peak periods, and the spread of these peaks is increasing. Officers from the LB Tower Hamlets have stated that the main issue challenging the borough is road congestion.

Current policy focuses on the need to move towards greater use of public transport and reduced dependency upon the private motor car. Future growth in Tower Hamlets will depend upon the development, improvement and optimisation of the various public transport services and networks in the Borough. Growth targets in line with the London Plan or at a greater level will be achieved only with substantial investment in public transport. The Borough is actively supporting key new projects such as Crossrail and the extension of the East London Line.

As well as development and maximisation of the use of the public transport network, other transport opportunities will need to be examined:

- Optimisation of use of the highway network, including Intelligent Transport Systems;
- Consideration of the impact of congestion charging and/or road user charging;
- Car parking restraint;
- Mixed-use development to reduce the need to travel;
- Development (and signing) of safe and attractive cycle and pedestrian routes.
UTILITY INFRASTRUCTURE

In general London is well served by all major infrastructure: Electricity, Gas, Water, Drainage and Telecoms. However due to economics of the privatised network most systems are operated close to capacity and therefore any major developments are likely to require varying degrees of infrastructure improvements.

Furthermore any developments in London must give due considerations to the London Plan. The London Plan along with other policies sets guidelines for energy efficiency, recycling targets, water reduction targets and reduction in CO2 emissions.
1. introduction

The London Borough of Tower Hamlets has commissioned a consortium of consultants to prepare Area Action Frameworks (AAFs) for three key areas within the borough (depicted in Figure 1 Study Areas):

1. Leaside (to the west of the Borough)
2. City Fringe (to the east of the Borough)
3. Isle of Dogs (to the south of the Borough)

Ultimately the AAFs will provide a clear investment framework to shape future development and growth in each of the key areas. The AAFs will guide developers, landowners, investors and council planning decisions.

A key consideration for shaping future development is the provision of transport and utility infrastructure, now and into the future. This report provides a review of the existing baseline information relating to transport and utility infrastructure for the three AAF areas. It does not consider the ‘Central Area’ of the Borough, although many of the existing information sources are borough-wide.

The report is structured as follows:

- **Section 2 ~ Development Projections:** discusses the development projections identified for the Borough as a whole and the individual AAF areas
- **Section 3 ~ Transport Overview:** identifies key transport issues that affect future development
- **Section 4 ~ Leaside Transport:** identifies the transport modal splits; baseline conditions for road, rail and bus; and the future transport proposals for road, rail, bus, street scene improvement, regeneration, walking and cycling
- **Section 5 ~ City Fringe Transport:** identifies the transport modal splits; baseline conditions for road, rail, bus and parking; and the future transport proposals for road, rail, bus, parking, area based schemes and street scene improvements
- **Section 6 ~ Isle of Dogs Transport:** identifies the transport modal splits; baseline conditions for road, rail, bus and river; and the future transport proposals for bus, walking, cycling, area based schemes, station access and street scene improvements
- **Section 7 ~ Transport Improvement Summary:** summarises the main infrastructure improvements in the AAF areas
- **Section 8 ~ Utility Infrastructure Overview**: identifies the key utilities and the utility issues that affect future development, and how future development might affect future utility usage and how the utility companies may address this.

- **Section 9 ~ Leaside Utility Infrastructure**: identifies the baseline conditions and discusses future demand for Electricity, Gas, Water, Drainage and Telecoms.

- **Section 10 ~ City Fringe Utility Infrastructure**: identifies the baseline conditions and discusses future demand for Electricity, Gas, Water, Drainage and Telecoms.

- **Section 11 ~ Isle of Dogs Utility Infrastructure**: identifies the baseline conditions and discusses future demand for Electricity, Gas, Water, Drainage and Telecoms.

- **Section 12 ~ Energy Options**: identifies the main alternative energy options available and discusses how they might apply in each of the AAF areas.

- **Appendices**: a series of drawings generally depicting current and future transport infrastructure.
2. Development projections

**INTRODUCTION**

There are a number of policy documents that have been produced that identify the potential for development for the areas covered by the AAF’s. These documents give guidance to the likely levels of development and include anticipated growth figures in terms of employment numbers and new residential units.

**EAST LONDON SUB REGIONAL DEVELOPMENT FRAMEWORK**

The London Plan advocates a minimum increase of 142,300 homes in the East London Sub Region by 2016. Within Tower Hamlets itself the total number of new homes between 1997 and 2016 is expected to be 41,280, equating to an annual monitoring target of 2,070 new homes.

The net completion targets for new homes in Tower Hamlets for 2002 and 2003 combined were 4,140. For the same period the two year net completion figure achieved was 2,891, 70% of the target figure.

It is clear that the increased housing targets cannot be met without achieving considerably higher densities. In Tower Hamlets between 1995-1998 the development density was 83 dwellings per hectare, in the three year period 1992-2002 the development density increased to 113 dwellings per hectare, an increase of 30 dwellings per hectare.

The London Plan projected that in 2001 to 2016, the total employment in East London might grow, in real terms by 249,000. 90% of these jobs were expected to be in the office sector and almost all of these would be in the City, City Fringe and Isle of Dogs.

However, largely because of the rebasing of the projections, the absolute level of employment growth by 2016 in East London is now expected to be some 25,000 less. Most of the reduction is likely to be in the financial and business services sectors.

Retail development in Tower Hamlets to 2016 in the Isle of Dogs was projected at 8,360 m² of additional comparison floor space and 5,740 m² of additional convenience floor space, and at World Trade an additional 3,300 m² of convenience floor space.
THE AAF AREAS

Development within each of the AAF areas has been identified in the Tower Hamlets New Unitary Development Plan up to 2016 First Deposit Draft May 2004 (UDP).

For Leaside specific targets in the London Plan provided 8,500 new jobs and 6,000 new homes to 2016. However, the UDP states that subject to appropriate infrastructure provision the figure for housing in Tower Hamlets alone is considered likely to be more in the range of 13,000-15,000.

The UDP states that for the City Fringe AAF area the Bishopgate/ South Shoreditch area is required to provide 16,000 jobs and 800 additional residential units and in Whitechapel/ Algate 14,000 jobs and 700 additional residential units. Therefore in total an additional 30,000 jobs and 1,500 additional homes.

Specific targets provided for the Isle of Dogs include the area should aim to accommodate a minimum of 100,000-150,000 jobs by 2016, and at least 3,500 additional dwellings, increasing the population by a minimum of 9,000 people from 2002 to 2016. Given this target was devised from a smaller area than is included in the Isle of Dogs AAF the figure for additional dwellings in the AAF is more likely to be in the region of 8,000 new dwellings.
3. transport overview

INTRODUCTION

Transport and general movement capacity is one of the biggest issues confronting future growth and economic vitality of urban areas. Road networks are generally operating at and, in some cases, beyond capacity during morning and evening commuter peak periods, and the spread of these peaks is increasing. Officers from the LB Tower Hamlets have stated that the main issue challenging the borough is road congestion.

Current policy focuses on the need to move towards greater use of public transport and reduced dependency upon the private motor car. Future growth in Tower Hamlets will depend upon the development, improvement and optimisation of the various public transport services and networks in the Borough. Growth targets in line with the London Plan or at a greater level will be achieved only with substantial investment in public transport. The Borough is actively supporting key new projects such as Crossrail and the extension of the East London Line.

As well as development and maximisation of the use of the public transport network, other transport opportunities will need to be examined:

- Optimisation of use of the highway network, including Intelligent Transport Systems;
- Consideration of the impact of congestion charging and / or road user charging;
- Car parking restraint;
- Mixed-use development to reduce the need to travel;
- Development (and signing) of safe and attractive cycle and pedestrian routes.

The following sections set out the transport situation in each of the AAFs. It should be noted that due to the strategic nature of rail the same situation generally applies to each area.
In order to consider the likely change in modal split the Travel to Work (TTW) data from the 2001 Census is shown below. This shows the mode split for journeys to work in the borough.

<table>
<thead>
<tr>
<th>Mode</th>
<th>TTW (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>5.1</td>
</tr>
<tr>
<td>Tube</td>
<td>37.3</td>
</tr>
<tr>
<td>Bus</td>
<td>10.4</td>
</tr>
<tr>
<td>Car Driver</td>
<td>16.5</td>
</tr>
<tr>
<td>Car Passenger</td>
<td>1.4</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>1.1</td>
</tr>
<tr>
<td>Walk</td>
<td>15.8</td>
</tr>
<tr>
<td>Cycle</td>
<td>3.0</td>
</tr>
<tr>
<td>Taxi</td>
<td>1.0</td>
</tr>
<tr>
<td>Work from home</td>
<td>7.7</td>
</tr>
<tr>
<td>Other</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 1.1: Travel to Work Modal Split, National Census 2001**

The emerging Sub Regional Development Frameworks give an indication of the overall increase in transport capacity in East and Central London. In East London there will be a 50% increase in public transport capacity between 2001 and 2016; nearly half of this is provided by Crossrail. Central London enjoys a high level of public transport accessibility and capacity. The highway network is also dense with extensive coverage. The major schemes in London are predominantly public transport based, with limited road or highway improvements.

The remainder of this report looks at the main areas of improvement in each of the AAFs. Data for this report has largely been obtained from other published sources including:

- Tower Hamlets Borough Spending Plan (BSP)
- Transport Assessment (Revised) Lower Lea valley Olympic and Legacy Planning Applications May 2004, London development Agency
- Olympics Area Accessibility Study, December 2004, Capita Symonds
- Isle of Dogs Cordon Survey 2002
- Canary Wharf Employees Survey, 2003, Steer Davies Gleave
- City Fringe Action Plan, Additional Transport Input, November 2003, Faber Maunsell
- Review of Isle of Dogs Transport Capacity Study, April 2003 Update
A number of figures have been presented at the end of this report. They cover all three AAFs. They are not referenced in the text, but a brief description of each figure is given below:

- Figure 1: Study Areas, shows the three AAFs
- Figure 2: Transport Network, shows the current transport network
- Figure 3: Existing Parking Strategy, shows the key parking zones, this is largely applicable to the City Fringe AAF where there have been changes
- Figure 4: Proposed Parking Strategy, showing the sub-zones and restrictions
- Figure 5: Existing Bus Routes
- Figure 6: Existing Rail Routes
- Figure 7: Rail/Bus Improvements, showing key proposals for improvements to services (Crossrail is excluded due to limited route information)
- Figure 8: Rail Stations, showing the stations where improvements are proposed around the stations to create better access routes
- Figure 9: Borough Spending Plan, showing schemes that will impact on the three AAFs.
4. Leaside transport

INTRODUCTION

This area has been considered in the work supporting the Olympic bid and the regeneration of the Lower Lea Valley. This means that there are already some details on accessibility, the current limitations and the potential to improve the transport network. The very fact that the area is being considered for regeneration and is the focus the London bid for the Olympics means that there is great potential for improvements to the transport infrastructure.

In terms of need, the fact that the area is identified as a national regeneration priority indicates that there is some deprivation locally. Historically the manufacturing sector had employed a significant proportion of people in the area. The downturn in this sector of the economy in the early 1990's meant that the area was hit hard. There are barriers, both physical and social, which have led to low levels of accessibility in the area. There is also a high proportion of Council and socially registered housing. As a result of this the new UDP includes in its key messages:

- There is no real focus for the area and existing communities are isolated; and
- There is a need to improve environmental quality, access and social cohesion.

MODAL SPLIT

The transport assessment for the Lower Lea Valley Olympic and Legacy Planning Applications set out a predicted modal split. In the absence of other data this has been repeated here. In future work on the Leaside AAF the modal split presented below will be used to estimate the number of people travelling by each mode. The data presented relates to work trips to employment (commercial) uses and from residential uses.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Employment (to)</th>
<th>Residential (from)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>Bus</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Car Driver</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Walk</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Cycle</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Taxi</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 1.2: Predicted Modal Split (taken from Transport Assessment (Revised) Lower Lea valley Olympic and Legacy Planning Applications May 2004, London development Agency)
ARRIVALS BY DIRECTION

The arrivals by direction (proposed) are presented on the table below. This is also taken from the transport assessment for the Lower Lea Valley Olympic and Legacy Planning Applications.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Car-based work trips</th>
<th>Non-car based work trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>43</td>
<td>53</td>
</tr>
<tr>
<td>South</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>East</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>West</td>
<td>35</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 1.3: Proposed Direction of Arrivals (taken from Transport Assessment (Revised) Lower Lea valley Olympic and Legacy Planning Applications May 2004, London development Agency)

ROAD BASELINE CONDITIONS

The study area suffers from a number of barriers to access across the area. Some of these barriers are as a result of major roads in the area. These include:

- A102 Blackwall Tunnel Northern Approach Road providing a major north-south connection
- A13 East India Dock Road, providing a major east-west link
- A11 Stratford High Street, also providing a major east-west link

These roads also link into the local network. However there are limited routes through the area. It is important to note that the three main links listed above provide important access points to the wider strategic network, including the M11, A406 North Circular Road, the A2 and the A10.

At a local level, the lack of cross valley routes compounds the area’s isolation.

Traffic data has been collected for Stratford High Street which showed that 1,900 vehicles per hour were travelling eastbound in the AM peak.

PUBLIC TRANSPORT BASELINE CONDITIONS

The Public Transport Accessibility Level (PTALs) map shows areas of poor public transport accessibility. The following areas in the AAF are least accessible:

- Bow Common
- South Bromley
- The area bounded by the River Lea, Blackwall Tunnel Northern Approach, East India Dock Road and Devas Street
RAIL BASELINE CONDITIONS
A review of accessibility was undertaken for the Lower Lea valley, and much of the data is relevant to the AAF. It showed that the following areas enjoyed good accessibility:

- Stratford – whilst not in the study area, its close proximity improves access by public transport around this station and will have some positive benefit to the northern end of the AAF. Services to Stratford include the JLE, Central Line, North London line and the Great Eastern Rail services.
- The Hammersmith and City line at Bromley by Bow and the DLR at Bow Station mean that the central part of the AAF have reasonable access to services.

The area bounded by the River Lea, the A13 and the A102 has low accessibility levels. This is also the case for the area to the east of East India Dock Basin where the river and the A1020 Lower Lea Crossing prevent access to Canning Station.

A particular issue is the over crowding that occurs on the westbound services, for instance the Great Eastern line westbound has a 3 hour morning peak capacity of 41,300 and a flow of 49,000.

The area is served by tube stations at Stratford (JLE and Central line) and Bromley by Bow (District and Hammersmith and City lines). The capacity of the District and Hammersmith and City lines is limited. It is estimated that during the peak hour the westbound services would be 132% full. This is based on a 3 hour peak capacity of 45,740 and a flow of 37,400. The reason the peak hour is crowded is that 50% of the flow occurs in the peak hour.

There are 2 DLR stations in the study area (Bow Church and Devons Road) and a further 3 DLR stations at the southern edge of the area (Blackwall, East India and All Saints). This provides access to the north-south line and east-west line.

At present it’s estimated that the DLR is running at 78% capacity in the direction of Canary Wharf.

BUS BASELINE CONDITIONS
The coverage of the bus network in the AAF is quite comprehensive with key routes into the City being along Mile End Road, Commercial Road and Roman Road.

Work by the London Borough of Newham in developing its Medium Term Action Plan for Buses looked at the level of usage of routes. It identified roads where there were more than 100 passengers per hour on services. Most roads along which bus services operate in this AAF had less than 100 passengers per hour.

Service 25 is seen as a flagship route, using higher capacity bendy buses, which increased capacity by 40%. There is an issue that people using this service tend to make longer journeys, making it difficult for people who want to make shorter interim journeys.
At present the networks are operating at 35% capacity in the 3 hour morning peak. Similar to rail there is a concentrated one hour peak period within this, where approximately 50% of the journeys are made. This would suggest that during this hour services will be crowded.

**ROAD INFRASTRUCTURE FUTURE PROPOSALS**

There are six proposals which impact on highways in the AAF area:

- Minor amendments to pedestrian facilities at the Bow roundabout
- Minor improved pedestrian facilities on the A12 at Twelvetrees Crescent/ Devas Road and Lochnagar Street/ Zetland Street
- Reduction of the speed limit on the Blackwall Tunnel Northern Approach/ East Cross Route (A12) from 50mph to 40mph
- Remodelling of Canning Town Roundabout
- Extend Gillenda Street to Ailsa Street
- Provide a new Carpenters Road link from the A11 to Stratford City

The impact of these will be to improve flow of traffic and to improve facilities for pedestrians. The introduction of additional capacity is difficult to measure and has not been estimated here. The last proposal is not within the study area but is likely to have a positive impact for traffic.

The Thames Gateway Bridge, proposed to open in 2010, will improve north south traffic flow in the east London.

**20mph Schemes**

**Teviot Area 20 Mph**

Teviot area lies between the A12 to the east, Chrip Street to the west and East India Dock to the south in the Leaside area of Tower Hamlets. It is mainly a residential area. There have been 25 personal injury accidents since September 2003 with 6 of them involving children.

A bid for funding has been made to implement a 20 mph scheme in the Teviot area in 2005/06.

The scheme is a predominantly residential area and suffers from rat running due to the A12. A 20mph restriction will be introduced to protect the residents of the intrusive traffic while improving road safety and the environment. Improved pedestrian safety will benefit children walking to and from school and commuters to local transport links.

**RAIL FUTURE PROPOSALS**

There are two main proposals with respect to rail in the AAF area:

- The opening of Stratford International Railway Station due in 2007
- The implementation of Crossrail

The opening of Stratford Station by 2007 and the associated Channel Tunnel Rail Link (CTRL) and domestic services will potentially provide commuter services to the area. Whilst Stratford Station is not in the actual area, its proximity will be of benefit to it. The service pattern has not yet been established; however the CTRL has been designed to accommodate 8 international trains per hour and 8 domestic services per hour.
The Crossrail project is discussed in further detail in the section on the City Fringe. However, it is worth noting that the project will reduce numbers of passengers travelling on the District, Metropolitan, and Hammersmith and City lines.

The proposals for the tube services affecting this area are similar to that of the City Fringe namely:

- Increase in number of peak hour services on the Jubilee line from 27 trains per hour to 33 trains per hour, and an increase in the number of train cars from 6 to 7 (this is likely to divert some trips off other congested routes).
- Increase in number of peak hour services on the Central line from 27 trains per hour to 33 trains per hour.

The increase in capacity on the DLR through increasing the number of train carriages adds approximately 50% more capacity. This would affect the line between Bank and Lewisham. Whilst this does not directly run through the AAF area, the additional capacity will reduce crowding on all services which run down to Lewisham.

In addition to the major proposals, Bromley-by-Bow Station is one of a number of stations where accessibility will be improved to make trips to the station easier and safer.

**BUS FUTURE PROPOSALS**

There is a planned expansion of the bus network to increase capacity by 40% in the next 10 years in conjunction with development proposals. Options for doing this include further use of bendy buses, adjusting, extending or introducing new routes and increasing frequencies on routes.

**STREET SCENE FUTURE IMPROVEMENTS**

**Devon’s Road Street Scene**

Devon’s Road is also known as the B140 and runs east-west between A13 East India Dock Road and the A11 Bow Road. It is an important local corridor as it connects a high density residential development on either side and provides access to St. Andrews Way Business Park, industrial/commercial businesses along Violet Road and around Bow Common Lane/Thomas Road. This scheme identified in the BSP and was scheduled to start in 2003/04.

The Devon’s Road/St. Paul’s Way corridor is highlighted as the ‘Most Deprived’ 0-10% category of the London Index of Deprivation. Part of Devon’s Road lies within the Leaside Action Area as identified in the draft UDP which concentrates on promoting sustainable communities by providing physical links through the area focusing on public transport, walking and cycling improvements, i.e. proposal of new bus routes.
The scheme is expected to have the following results:

- Promoting increased use and greater numbers pedestrian and cycles along the route
- Improved personal security and safety
- Improved perception of the area for residents, workers and visitors
- Community capacity building and increase in social contacts
- Possibly reducing vehicle speeds and movements through the area

**REGENERATION FUTURE PROPOSALS**

**Bow Area Access**

Bow Area is located between A11 Bow Road in the south and Roman Road in the north, with Fairfield road in the east. Amongst other functions, there is the ‘Fish Island’ business park in the area that attracts the majority of traffic off the A12.

The BSP identified the need to provide signal control on both the A12 slip roads at their junction with Wick Lane, in order to meter traffic in to what is a mainly residential area.

The scheme is expected to:

- Control the movement of traffic to provide the basis for regeneration in the area, opening up land for new development, businesses and associated job opportunities
- Although not an accidental remedial measure, it is anticipated to cause a reduction in accident figures
- It is possible that there will be additional delays in traffic

**WALKING FUTURE PROPOSALS**

Whilst there are no specific plans for improvements for pedestrians the work to Blackwall Park detailed in the section on the Isle of Dogs will have a positive impact in that it improves linkages between two communities and the transport interchange at Blackwall Station.

**CYCLING FUTURE PROPOSALS**

Improvements to promote cycling are aimed at increasing the number of people using this mode and improving their safety.

**Raven Row-Solebay Street- new cycling routes**

Raven’s Row is located just off of the A11 Mile End Road, and bound by the Mile End Park on the east. This scheme is due to commence in 2004-2005 and comprises signing and lining of the entire length of the route, 12 junction improvements and providing facilities for cyclists and improving driver awareness.
LEASIDE AAF CONCLUDING COMMENTS
The targeting of this area as a site for regeneration and the site for the Olympic bid will lead to investment in the existing infrastructure. The proposals for Crossrail and the improvements to the underground and DLR services will lead to an opening of capacity in the medium term. The Crossrail project is estimated to improve the poor conditions currently occurring on the Central, District and Jubilee lines.

Soft measures are being implemented to make using the rail network easier. These include the improvements to stations across the Borough as part of the BSP. It can be assumed that the bus operators will respond to additional demand through the provision of additional services. In the shorter term the demand to make short journeys on the service 25 need to be addressed.

The improvements to street scene and cycling will facilitate a working and living in close proximity.
5. city fringe transport

INTRODUCTION
The City Fringe area includes sections of the A501 (Inner Ring Road) (between Tower Hill Gyratory and the Shoreditch Triangle Gyratory). The study area includes a number of radial routes including The Highway (A1203), Commercial Street (A13), Whitechapel Road (A11), and Kingsland Road (A10). All these roads form part of the Transport for London Road Network. The A501 forms boundary of the Congestion Charging Zone.

The A11, A10, A13 form sections of Flagship LBI Routes and therefore support a high level of physical bus priority measures. There are three other important non-TLRN routes in the area namely Cable Street, Bethnal Green Road and Hackney Road.

MODAL SPLIT
Previous work looked at the predicted modal split to the area for both employment and residential uses. These are presented on the table below. This data can be used to predict the number of people using each mode, and to eventually estimate the demand that will be placed on the network.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Employment</th>
<th>Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>52</td>
<td>34</td>
</tr>
<tr>
<td>Tube</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Bus</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Car Driver</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Car Passenger</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Coach</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Walk</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Cycle</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Taxi</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1.4: Predicted Modal Split (taken from City Fringe Action Plan, Additional Transport Input, November 2003, Faber Maunsell)
ARRIVALS BY DIRECTION

Work was undertaken on the direction of arrival; this was taken largely from the public transport survey data shown in the City Fringe Action Plan by Faber Maunsell.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Employment (arrivals)</th>
<th>Residential (departures)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>South</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>East</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td>West</td>
<td>67</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 1.5: Direction of Travel (taken from City Fringe Action Plan, Additional Transport Input, November 2003, Faber Maunsell)

ROAD BASELINE CONDITIONS

Congestion is a key issue but has been alleviated on many streets by congestion charging. Permeability can be difficult in some areas particularly by non-car modes. The following locations need consideration:

- Commercial Street
- Aldgate gyratory/ Tower Hill gyratory
- Leman Street
- Brick Lane (enhancements scheduled to be complete during 2004)

There is poor access to Wapping by vehicular transport.

PUBLIC TRANSPORT BASELINE CONDITIONS

The PTAL map shows that much of the AAF has good levels of public transport accessibility. The exception to this is the area around Wapping and St Katherine’s Docks.

RAIL BASELINE CONDITIONS

The following table sets out the current tube/ DLR services in the peak and interpeak period through the area.

<table>
<thead>
<tr>
<th>Line</th>
<th>Trains per hour - Peak</th>
<th>Trains per hour - Interpeak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To East</td>
<td>To West</td>
</tr>
<tr>
<td>Central</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circle/Hammersmith &amp; City</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>District</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Jubilee</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>East London</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>DLR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lewisham – Bank</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Crossharbour – Bank</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Beckton – Tower Gateway</td>
<td>8.5</td>
<td></td>
</tr>
</tbody>
</table>

Table 1.6: Rail Capacity (taken from City Fringe Action Plan, Additional Transport Input, November 2003, Faber Maunsell)
Key areas of crowding can be identified as those where the volume to capacity ratio (VCR) of:

- 0.5 – moderate crowding currently occurring on the Hammersmith & City/ District lines
- 0.65 – high levels of crowding currently occurring on the Central and C2C lines
- 1.0 – very high levels of crowding currently occurring on the Great Eastern line.

**BUS BASELINE CONDITIONS**

Some areas of crowding is seen at:

- Hackney Road, westbound services, saw an average of 7 passengers per bus standing
- Kingsland Road, southbound towards the City, saw an average of 19 people per bus standing; the legal standing capacity is 20 per bus

**PARKING BASELINE CONDITIONS**

City Fringe covered by two (2) controlled parking main zones, each split into two (2) further zones:

- Zone A1 – residential only
- Zone A2 – residential only
- Zone C1 – mixture of residential, permit and pay and display bays
- Zone C2 – multi-use, permits and residential bays

Observations have shown the levels of use to be:

- Zone A1 – 78%
- Zone A2 – 81%
- Zone C1 – 76%, but the use of residential spaces is 93%, with the business and permit spaces being filled to a capacity of 89% and 87% respectively
- Zone C2 – 61%, the residential spaces are filled to 84% full

The council proposed measures in 2003 to further reduce intra borough car based trips need to check the status of this.

**ROAD INFRASTRUCTURE FUTURE PROPOSALS**

Commercial Street: there is potential to improve pedestrian facilities, but may impact on the Shoreditch and Aldgate gyratory by creating traffic queues which could block the gyratory.

- Aldgate gyratory: there are proposals to remove the gyratory system.
- Tower Hill gyratory: the removal of Aldgate gyratory is likely to require the removal of Tower Hill gyratory.

At Leman Street there is potential to improve pedestrian facilities, but such measures would need to ensure that changes to Aldgate gyratory would not increase the traffic on this road. In general terms the impact of road traffic from new development is likely to be insignificant once it is dispersed across the network. Any increase less than 5% is deemed insignificant.
20mph Schemes

Commercial Street West 20mph

This area is bound by Commercial Street, Whitechapel High Street, Bishopsgate and Middlesex Street. The area is included in London’s Congestion Charging Area. The area contains a mix of residential, new and old commercial businesses, and large developments. There have been 22 personal injury accidents in the past 3 years. This scheme is proposed to be introduced in 2005/06. The scheme will introduce a 20mph zone to improve road safety and encourage walking.

RAIL FUTURE PROPOSALS

Due to the long term nature of rail improvements and the uncertainty of Crossrail, two scenarios need to be considered:

- “2016 Do Minimum” which includes the following improvements:
  - East London line project
  - Channel Tunnel Rail link - domestic services
  - Thameslink 2000
  - DLR extensions
  - LUL service upgrades.

- “2016 With Crossrail” includes all the above improvements plus Crossrail

There are a number of proposals for improvements to the Tube/ DLR system, which include:

- Central line: increase frequency of service by up to 6 trains per hour in the peak periods to up to 33 trains per hour.
- Jubilee line: increase the length of the trains by one car, from 6 cars to 7; and increase the frequency from 27 trains per hour to 33 trains per hour.
- Introduce the East London line service, comprising a total of 16 trains per hour, introducing a line capacity of 7,700 passengers.
- Increasing the length of DLR trains from 2 cars to 3.

The implementation of the Crossrail project will significantly improve the crowded conditions on the Central line through the provision of extra capacity. The scheme will see the introduction of an east-west rail line through the centre of London with new stations at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel and Isle of Dogs (Canary Wharf). It will lead to better accessibility at Liverpool Street and Whitechapel stations. The system will have a line capacity of 21,000 people, and is likely to carry in the region of 20,000 people in the AM peak hour on the Stratford line westbound.

The “2016 Do Minimum” scenario will see an increase in passenger volumes coming into the City and through the City Fringe from the west. It is estimated that there will be an additional 6,300 passengers arriving into Liverpool Street on Anglia, Great Eastern and WAGN services. Central line volumes will increase by 2,000 in the AM peak hour. Changes on the Circle/ Metropolitan and Hammersmith and City lines will allow and additional 5,000 eastbound passengers. There will be crowding on the East London line and on the westbound Circle/ Metropolitan line.
The “2016 With Crossrail” scenario will have the following impacts:

- Decrease volumes on the Great Eastern line westbound by 12,000
- Decrease passengers on the Central line by 1,000
- Increase passengers on the East London line by 900, leading to overcrowding at Wapping Station
- Decrease passengers by 3,200 on the Circle/ Metropolitan and Hammersmith and City lines.

The absence of the Crossrail project will lead to increased overcrowding and poor conditions for rail and tube users. This would make the implementation of future development challenging unless a true work-live balance could be struck.

Additional to these improvements access improvements will be made to Wapping and Aldgate Underground Stations. At Wapping this work will include:

- Shortening the bus cage
- Providing raised tables at junctions
- Relocating lamp column
- Providing dropped kerbs

Similar treatments are proposed for Aldgate.

**BUS FUTURE PROPOSALS**

The provision of bus services is flexible when compared to rail, however the corresponding capacity improvements are relatively small. The potential extensive development will require an increase in bus services; currently some services are operating at capacity at peak times.

Of importance is the links to bus facilities and the accessibility of interchanges.

It is estimated that in 2016 westbound services on Hackney Road will be over subscribed by approximately 1,300 passengers in the AM peak hour. The other key routes are unlikely to be over-subscribed, but it will be important to ensure that routes to the services are safe and attractive in order to avoid a modal shift onto the tube services.

**PARKING FUTURE PROPOSALS**

The availability of parking spaces is reliant on the implementation of stringent parking standards and the continued enforcement of the CPZ.

Data has shown that there is some capacity for parking; however the policy is one which will see the future use and provision of parking controlled.

**AREA BASED FUTURE SCHEMES**

**Bethnal Green Boulevard-Town Centre**

Bethnal Green Road is located east of Shoreditch High Street in East part of London and forms an important community level link towards Brick Lane, and is a cultural destination in the Tower Hamlets area. The proposed date of scheme is 2005-2006.
The overview of the proposal offers the opportunity to do a health check for Bethnal Green Road. It looks at studies to resolve local problems with locally identified solutions, through a truly unified approach to street design. The ‘Blank Slate’ design approach is proposed, to integrate needs of different users within an innovative, attractive urban realm development aim to increase walking and cycling and personal security. This will complement the ongoing work of the Bethnal green gateway works, adding value to this TfL funded scheme.

**STREET SCENE FUTURE IMPROVEMENTS**

The proposals in the BSP to improve the street scene aim to improve

- Social inclusion
- Increase cycling, walking and accessibility
- Encourage use of public transport
- Reduce in vehicle dominance.

**Cartwright Street**

Cartwright Street is located just south off Royal Mint Street. It is located south of the Whitechapel area in London and just North West of Wapping area. It is predominantly a residential area, and the improvements target improving the connectivity to this area, making it an attractive area for people to live, work and visit. This scheme is due to commence in 2004-2005.

The Royal Mint area is in the ‘Most Deprived’ 0-10% category of the London Index of Deprivation. The scheme is identified in the ‘Borough Approved’ PLP Open Spaces Strategy; and major elements of it are identified on the draft UDP Area Action Plan. Community projects to uncover real problems are being funded and carried out this year. This will mean resulting improvements will lead to a change in perception of pedestrians.

The scheme will allow high numbers of pedestrian and cyclists in the adjacent Tower of London and St. Katherine’s Docks to permeate further in to Tower Hamlets through the Royal Mint area. Due to the high level of existing community involvement and support for these projects, this scheme is highly deliverable.

**CITY FRINGE AAF CONCLUDING COMMENTS**

The key issues in this AAF are:

- Poor accessibility in the south of the area, around Wapping and St Katherine’s Docks
- Potential crowding on the existing rail and tube lines if Crossrail does not proceed.

Development around Wapping and St Katherine’s Docks would need to be supported by measures to improve public transport. The simplest way of doing this would be to introduce new bus services to penetrate the area. The work at Wapping Station and around the Royal Mint will help improve the accessibility.
If it is assumed that Crossrail proceeds, many of the existing problems (severe crowding on Great Eastern line and crowding on the Central and C2C services) will be removed. However timescales for Crossrail are relatively long, in the short to medium term development would need to be concentrated around those areas which benefit from the tube and DLR improvements, namely around stations with Central line, Jubilee line, East London line or DLR services.
6. isle of dogs transport

INTRODUCTION
This section sets out the base conditions and future proposals for the Isle of Dogs. The AAF is served by the A1261 running east-west at the northern end of the island. There are only two access points at Westferry Road and Prestons Road, which form a periphery road around the island. Most of the other roads are local in nature.

The Canary Wharf Employment Survey from 2003 provides data on modal split. This is shown below:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail + Tube</td>
<td>24%</td>
</tr>
<tr>
<td>Tube</td>
<td>22%</td>
</tr>
<tr>
<td>Rail /Tube + DLR</td>
<td>28%</td>
</tr>
<tr>
<td>DLR</td>
<td>10%</td>
</tr>
<tr>
<td>Bus/coach</td>
<td>3%</td>
</tr>
<tr>
<td>Car Driver</td>
<td>6%</td>
</tr>
<tr>
<td>Car Passenger</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 1.7: Observed Mode Split (taken from Canary Wharf Employee Survey 2003)

ROAD BASELINE CONDITIONS
The highway capacity is limited by two access points at Prestons Road/Aspens Way in the east and Westferry Road in the west. Capacity is estimated to be approximately 4,000 vehicles per hour. The limited amount of parking also influences the amount of traffic on the island.

RAIL BASELINE AND FUTURE CONDITIONS
The island is served by the Jubilee Line Extensions (JLE), and the DLR. In the future it is assumed that it is also served by Crossrail.

The JLE is currently scheduled to operate a 6-car 24 trains per hour (tph) for the peak hour in the peak direction and with 20tph scheduled to operate in the non-peak direction. It should be noted that the definition and timing of the major upgrade beyond 24tph has yet to be firmly established.
Table 1.8: Current and Future Capacity on Jubilee Line (taken from Review of Isle of Dogs Transport Capacity Study, April 2003 Update)

DLR peak hour frequencies are shown in the table below. Services were increased in late 2002 following the agreement of the franchise extension. The opening of DLR London City Airport Extension would also bring about an increase in service frequencies and capacity in late 2005. Additionally the increase in train length from 2 carriages to 3 will increase capacity by 50%.

Table 1.9: DLR Peak Hour Frequencies (taken from Review of Isle of Dogs Transport Capacity Study, April 2003 Update) (Pl Std = Planning Standard)

This includes services towards Beckton, serving the Isle of Dogs either via Westferry or Poplar.

For the purpose of the study, a branch of Crossrail is assumed to serve Canary Wharf with service frequencies of 12 tph. The internal configuration of National Rail rolling stock is different from London Underground stock and therefore there is no comparable planning standard capacity. However, the indicative figures of a planning standard capacity provided by Cross London Rail Links (CLRL) reflect the capacity shown in the table below.

Table 1.10: Crossrail Capacities (taken from Review of Isle of Dogs Transport Capacity Study, April 2003 Update)
**BUS BASELINE CONDITIONS**

There are five bus routes serving the Isle of Dogs. London Buses are currently reviewing the bus routes and have developed a number of proposals for short-term frequency enhancements on all routes. Further work is to be carried out on the potential for restructuring the local bus network, including the provision of a new route linking the City to the Isle of Dogs, and the extension of D7 to Canning Town.

<table>
<thead>
<tr>
<th>Route Number</th>
<th>Passengers per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3</td>
<td>240</td>
</tr>
<tr>
<td>D6</td>
<td>340</td>
</tr>
<tr>
<td>D7</td>
<td>360</td>
</tr>
<tr>
<td>D8</td>
<td>200</td>
</tr>
<tr>
<td>277</td>
<td>480</td>
</tr>
<tr>
<td><strong>Total capacity</strong></td>
<td><strong>1,620</strong></td>
</tr>
</tbody>
</table>

*Table 1.11: Bus Capacity (taken from Review of Isle of Dogs Transport Capacity Study, April 2003 Update)*

The Medium Term Action Plan for buses produced by the London Borough of Newham identified roads where bus usage exceeded 100 passengers per hour. This occurred in the following locations:

- Services on Westferry Road between Westferry Circus and Arden Crescent exceed 250 passengers per hour
- Services on other stretches of Westferry road, Manchester Road and Prestons Road exceed 100 passengers per hour.

**RIVER SERVICES BASELINE CONDITIONS**

River Services were also assumed to operate on two routes, from Rotherhithe and from Central London to Isle of Dogs. The peak hour capacity of these services is about 400 passengers.

**BUS FUTURE PROPOSALS**

It can be assumed that there is potential to increase capacity on buses through the introduction of additional services or larger vehicles. Additional measures to increase the modal split of buses includes:

- Substantial bus priority measures on key approaches to the island
- Improved infrastructure such as bus stops
- Opening new bus only links through Heron Quays and Tiller Road.
WALKING FUTURE PROPOSALS
There are a number of schemes to improve conditions for pedestrians on the Isle of Dogs. The aim of the schemes are to create:

- A modern, high quality, public space replacing land that is currently underused, inaccessible and in need for refurbishment
- A cleaner, safer, more pleasant street environment
- Increased confidence of local people in choosing to walk to local destinations to use local amenities and for pleasure
- Key streets as a pleasant and easy to walk through spaces
- Footways, paving materials and street furniture to act together and lead people along a safe and attractive route with a clear destination
- A linked network of attractive pedestrian routes to give people a range of possible routes appropriate for different times and abilities

The schemes are outlined below.

Blackwall Park
Blackwall is located south of Aspen Way and east of Canary Wharf, across the Thames from the Millennium Dome, in London.

A bid has been included in the BSP to work up a scheme to planning application stage in order to link two isolated communities (and a major transport node) via a footbridge. The scheme will also include environmental improvements around the bus terminus next to Blackwall DLR. The planned start of the scheme is 2004/05.

This scheme is expected to:

- Increase numbers of people walking along Aspen Way.
- Reduce journey time between growing new communities and exiting local community facility.
- Increase footway area and shared surfaces for greater ease of pedestrian movement.
- Remove of redundant street clutter.
- Upgrade pavement surfaces, enhancing the image of the area and helping direct pedestrians to places of interest.
- Improve safety and access to footways and crossings.
- Improve lighting to improve security and strengthen local character
- Integrated a new signage programme with other improvements to improve way finding, accessibility and permeability of the area.
Riverside Route

Tower Hamlets has undertaken a riverside audit to identify some of the key issues related to pedestrian usage of the area along the east riverfront of the Thames along the Isle of Dogs.

The aim of this proposal is to:

- Encourage and promote walking as a sustainable means of transport.
- To provide and maintain an accessible environment and overcoming physical barriers.
- Increase the amount of walking for healthier life.
- Improve safety and personal security for pedestrians, removal of trip hazards and enhancing the image of the area.
- Improve the signage and lighting conditions.

The implementation of this project will have a positive impact in the promotion of sustainable travel; also there will be no adverse impacts on other road users.

Addington Road (runs alongside Tom Thumb’s Arch cycling scheme)

Addington Road is a busy corridor for pedestrian access from the public transport facilities on Bow Road-Bow Church DLR station, Bow Road Underground station and bus routes into Central London and to Stratford. It is located east of Manor Road.

This scheme is programmed for 2004/05. The scheme comprises:

- Improvements to lighting, pavement surfaces, signage and information linking public transport to places of importance.
- Facilitation of pedestrian access and crossing points.
- Improvements to design on both sides of Tom Thumb’s Arch to enhance security as well as use of CCTV cameras.
- Improved drainage inside the archway.
- Improved quality of landscape with planting and by removing street clutter.

The advantage of implementing the proposal will be a safer pedestrian and cycle route from Bow Road Tube station and Bow Church DLR to residents and Roman Road Market. The possible road closures and limited access through Tom Thumb’s Arch during works in progress would be a short-term disadvantage.
CYCLING FUTURE PROPOSALS

The proposals for cycling aim to increase the number of cyclist using new routes and to minimise conflict between pedestrians and cyclists. They will also lead to improved safety for new and existing cyclists.

Tom Thumb’s Arch

This route forms part of the London Cycle network and is located eastern most route running north south.

This scheme will implement alternative cycle route via disused arch in conjunction with the DLR, the landowners and local housing association. The scheme is programmed for 2004/ 05. The proposal will give cyclists the option to use an alternative new route which will save journey time and will resolve conflict between pedestrian and cyclists.

STATION ACCESS FUTURE PROPOSALS

Specific work is programmed for Limehouse DLR which aims to allow a major interchange improvement with clearer interchange connections enabling dual mode trips and improved access to public transport for all, including those with physical or other disabilities. Whilst not in the Isle of Dogs AAF area, they will have an impact on travel to and from the area. These are described below.

Limehouse DLR

Limehouse is just off Commercial Road between Stepney Green and Poplar areas in Tower Hamlets.

This scheme is programmed for 2005/ 06. This will create a well designed accessible and safe environment for passengers and pedestrians by removing obstructions and car dominance.

The scheme benefits passengers making 13,000 trips each weekday from the DLR station. Approximately 2,500 people interchange during peak hour period and will benefit from the improvements. With works proposed by the DLR, this would provide a high quality interchange environment for the passengers.

STREET SCENE FUTURE IMPROVEMENTS

In traffic terms the improvements to the streetscene will:

- Increase cycling, walking and accessibility.
- Encourage use of public transport.
- Reduce vehicle dominance.

Stewart Street

Stewart Street is east off Manchester Road in the Isle of Dogs part of Tower Hamlets. The area is predominantly residential and could benefit from more tree planting and improving cycle access.

Proposals for Stewart Street aim to make the area better with improved lighting, footway widening, revision of parking arrangements and junction priority arrangements. The scheme is programmed for 2005/ 06.
The benefits of the proposals will be:

- Increased priority to pedestrians to reduced vehicle domination and improve cycle access.
- Improvements to street as a place to meet and linkage between neighbouring estates.
- Improve disabled access.
- Improved surfaces of pavements and roads.

**ISLE OF DOGS AAF CONCLUDING COMMENTS**

The area will benefit from the improvements in capacity on the JLE and DLR which are the two main exiting modes of transport into the Island. The potential provision of capacity through the Crossrail scheme will lead to an easing of congestion on parallel routes. In the short term capacity shortfalls could be met by improved bus services. In the medium term DLR and JLE improvements will offer additional capacity.
7. **transport improvement summary**

**MAJOR TRANSPORT INFRASTRUCTURE IMPROVEMENTS**

The table below summarises the main infrastructure improvements in the AAFs along with an indication of the timetable for undertaking the work.

As can be seen by 2011 it is estimated that much of the improvements and enhancements to the tube and DLR services will have been implemented. However the main increase in capacity (approximately 50%) will come as a result of the Crossrail project, which is estimated to be implemented by 2016.

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Lead Delivery Agency</th>
<th>Indicative Phasing</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Rail TOC Improvements</td>
<td>SRA</td>
<td></td>
</tr>
<tr>
<td>Underground PPP</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>Bus Capacity Increases</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>DLR London City Airport Extension</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>CTRL</td>
<td>SRA</td>
<td></td>
</tr>
<tr>
<td>DLR Bank-Lewisham Capacity Enhancements</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>East London Line</td>
<td>SRA</td>
<td></td>
</tr>
<tr>
<td>Jubilee Line Upgrade</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>DLR Stratford International</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>Crossrail 1</td>
<td>SRA/TfL</td>
<td></td>
</tr>
<tr>
<td>Thames Gateway Bridge (TGB)</td>
<td>TfL</td>
<td></td>
</tr>
<tr>
<td>Crossrail 2 (no decision on whether this will go forward)</td>
<td>TfL</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1.12: Summary of major transport improvements*
8. utility infrastructure overview

INTRODUCTION
This section reviews the key issues relating to infrastructure within London and more specifically within the Borough of Tower Hamlets.

In general London is well served by all major infrastructure: Electricity, Gas, Water, Drainage and Telecoms. However due to economics of the privatised network most systems are operated close to capacity and therefore any major developments are likely to require varying degrees of infrastructure improvements.

Furthermore any developments in London must give due considerations to the London Plan. The London Plan along with other policies sets guidelines for energy efficiency, recycling targets, water reduction targets and reduction in CO2 emissions.

PROJECTED DEMAND
Traditionally the approach adopted by utilities companies towards new developments has been that the client/developer, or their nominated representative, would undertake a capacity assessment and approach the utilities companies requesting additional supply. The utility provider would then evaluate the request and provide the appropriate solution. For prescriptive development this approach is relatively straightforward.

When considering demand, based on projected growth forecast, there are a number of issues that need to be understood.

1. Potential demand forecasts for utilities are typically calculated on square meterage of floor space. However, there are a number of inherent discords with this approach. Guidance on allowable floor space per person varies considerably and hence demand forecasting is not an exact science. However due to the large numbers under consideration, 25,000 new residential units and 190,000 new jobs, a balancing out of demand will occur and the final demand numbers estimated will resultanty be of the correct order of magnitude.
2. In addition to the above a further complication arises due to no time line for the delivery of this demand being available, and hence it is almost impossible for utility companies to assess potential future spare capacity for a 2010 or 2016 time horizon. This is further compounded by utility companies usually having only 5 year development plans. Therefore any request beyond this horizon cannot be assessed because the utility company has no committed plans for upgrading their network and supply capacity outside this timeframe. By undertaking discussions with utility companies, existing spare capacity in the local and regional networks can be estimated, the potential future demand can be overlaid and the potential shortfall or future capacity requirements can be calculated. This has been the approach adopted in undertaking this study. However, there are further issues that need to be taken into consideration when adopting this approach.

3. Due to large areas of East London having been identified for regeneration, in addition to the areas covered by Tower Hamlets AAF’s including the Lower Lea Valley and the Thames Gateway, the utility companies are faced by a compounded problem, that each of these areas will also impose additional unknown demand on their networks.

The utility companies operate a number of Strategic Networks which can reasonably be described as:

- National
- Regional
- Local

The regional and local Networks can be further sub-divided based on their strategic significance into:

- Primary Networks
- Secondary Networks

Most development applications to utility companies would only impose demand on Local Networks, however, due to the extent of proposed development identified in the AAF’s, there will be a need to assess not only Local but Regional and also National supply capacity.

4. Another complication of assessing potential demand based solely on proposed growth figures is that no details of the nature of development are available.

With regards to residential developments these may or may not require a gas supply and although it would be possible to impose a restriction on gas to residential developments, this would limit the type of development undertaken. For example, developers would be unlikely to contemplate high quality premier housing without at least a gas supply for cooking as they would be unable to sell them. Conversely it may be in the interest of housing trusts not to provide a gas supply to managed property since this would reduce their building insurance costs.
This situation is significantly more complicated when employment figures are considered. Although information is available as to the likely split into retail, commercial, industrial, offices etc, there is no guidance as to the likely typologies. For example a very high tech financial services office would require an extremely high and resilient telecoms network, whereas a low tech office development may require no more telecoms than a similarly sized residential development.

These constraints and potential conflicts are discussed in more detail for each utility in their sub regional assessments.

**ENERGY**

There is significant evidence to suggest that not only are our conventional natural resources used in the production of energy being depleted, but that the burning of fossil fuels and the subsequent release of carbon dioxide are major contributors to global warming and climate change. As a result the government has set a target of 20% reduction in CO2 emissions by 2010. One of the cornerstones of this approach being adopted in London is the use of Combined Heat and Power Plants (CHP). Whilst conventional CHPs are generally gas fired and not therefore fuelled by renewables, they offer a 30% reduction in CO2 emissions compared to traditional methods of power generation. These figures can be reduced further (approximately 70% net reduction) if renewable fuel sources are used. Therefore by use of an option such as “Waste” to fuel CHP, it is possible to address several of the major issues that are facing London in particular over the coming decades:

- Reduction in waste to landfill by using waste as a fuel source
- Renewable fuel sources reduce demand for fossil fuels
- CHP power generation from renewables reduces CO2 emissions by 70%

**WATER**

London typically has a shortfall of potable water. Predictions exist that suggest that the south east of Britain will receive 50% less rainfall in the summer season by 2080. Water reduction is also one of six Environmental Performance Indicators developed by the Movement for Innovation. Thames Water, responsible for providing potable water in London, is currently in the process of implementing schemes to cater for future demand. One example of this is the desalination plant proposed near Beckton which is due to be online in 2008. Thames Water is also in the process of establishing a reservoir near the M11, to discharge groundwater extracted from the Channel Tunnel Rail Link (CTRL) box. However, this in itself is not envisaged to solve the ever increasing water shortage.

**DRAINAGE**

The majority of the Borough of Tower Hamlets is served by a combined foul and surface water drainage network, which is collected locally and discharged into the Northern Outfall Sewer, which in turn transports the combined drainage to the sewerage treatment works in Beckton. Both the Northern Outfall Sewer and Beckton sewerage treatment plant are close to capacity. There are also a number of Combined Storm Overflows (CSOs) that currently discharge raw effluent in to the local watercourses during peak storm events, in order to relieve both the Northern Outfall Sewer and the treatment works at Beckton.
WASTE
London and the country as a whole is facing increasing pressure to change the way in which waste is managed. Currently 80% of household waste goes to landfill. In an attempt to combat this and redress that way people view waste, European Directives and Government legislation have been introduced to combat the increasing volumes of waste that we are generating and sending to landfill. The Landfill Directive was enacted in July 2004 as part of measures to limit the amount of material disposed of to landfill and to educate people to consider waste as a resource. There are many ways in which the amounts of waste can be reduced.

Whilst Recycling schemes are encouraged and targeted for growth, the amount of domestic and commercial refuse still being disposed of to landfill is significant. By re-evaluating the approach, and understanding the potential resource waste could become, it will be possible to obtain significant improvements. By considering waste as a resource it may be managed differently.

The measures do not only relate to domestic and commercial “Rubbish” they also relate to disposal of contaminated land. By reducing the number of registered landfill sites and increasing taxes on material disposed of to landfill, the Landfill Directive has changed the economic viability of remediating contaminated materials, such that they become suitable for re-use. Remediating on-site can invert the proportions of material currently disposed of to landfill. Current targets are 80% to landfill; remediation may enable this figure to be reduced to 20% and potentially even less as technologies evolve to support the emerging market.

WASTE TO ENERGY
There are many technologies available that capitalises on the resource potential of waste and use it as a fuel source to generate power. Incineration has been around for a considerable amount of time. However modern technologies such as Biomass and Pyrolysis when used to fuel efficient energy generating plants, provide a clean and safe source of fuel.
9. Leaside utility infrastructure

INTRODUCTION
The Area covered by the Leaside AAF also forms part of the eastern boundary of the Lea Valley regeneration strategy, and as such a considerable amount of information is available on both the existing and proposed infrastructure capabilities.

Baseline Overview
In general there is currently adequate provision to support the existing communities with no noticeable shortfall in capacity for any of the major utilities, although we understand that some areas are not as yet covered by broadband telecoms infrastructure. In addition we are aware that the major drainage infrastructure that serves this area is at or close to capacity during peak storm events.

Future Demand
It has been identified in the regeneration strategy that there are a number of potential development scenarios under consideration, which will generate both new development and intensification of especially existing residential areas. The UDP states that the Leaside AAF area should cater for 13,000-15,000 new residential units.

Unlike with other aspects of capacity provision such as open space, community facilities etc, utility provision cannot be looked at in isolation as any other development in and around the Lea Valley will also impose additional demand on the utility infrastructure network. This is especially true for the gas, potable water and electricity networks.

ELECTRICITY
The Leaside area is pre-dominantly served from the Bow sub-station located just south of the great eastern rail line within the confluence of the Bow back rivers and the Lea River.

Bow Substation
Bow substation currently cannot deliver significant amounts of more power because of the limitation of the 11kV panel. It has 2 x 80MW transformers which equals the capacity of the incoming overhead line. With a phased upgrade and change over to a new 11kV panel, Bow could deliver enough power for 15,000 to 25,000 new residential units.

It is possible to provide more power with the addition of a third transformer, but the incoming supply would have to be upgraded.
Although Bow could be upgraded in both the Olympic masterplan and regeneration strategy proposals, the additional capacity that could be generated is unlikely to be sufficient to supply the demand generated by the new development proposals.

There is also another major sub-station located to the south of the valley at West Ham.

**West Ham Substation**

Although West Ham substation has some spare capacity, it is assumed that much of this will be used by developments at Greenwich and Royal Docks areas.

West Ham could be upgraded with two (2) new transformers and a switchboard. This would release enough power for approximately 40,000 new residential units. Again much of this capacity will be required to supply other developments both in the Lea Valley and across the river at the Greenwich peninsula and Royal Docks areas. There are also technical constraints involved in delivering power over such long distances due to cable routes and associated power loss.

In the short term there is probably adequate capacity within the area to support new developments. However this is a short term solution and a more strategic approach should be developed to support future development.

In both the Olympic and Regeneration Strategy proposals it is recommended that an overall energy strategy is developed to support the future demand. The cornerstone of this strategy is the provision of CHP schemes to provide additional power. This approach is fully compliant with the recommendations of the London Plan.

Due to the location of Leaside its close proximity to Stratford City and the Lea Valley having been identified as mayor regeneration Area CHP schemes will be required to make up the shortfall in energy provision that will exist during the implementation of the AAF.

The option for energy provision by both CHP and renewable energy sources will be discussed in more detail later in this paper.

**GAS**

Any new development is likely to impose a varying increase in demand on the existing infrastructure. Preliminary investigations have indicated that the area has a network of medium pressure, intermediate pressure and low pressure mains.

There will be a need to put in place a gas infrastructure to support the AAF. This infrastructure will need to be highly resilient with built-in redundancy while maintaining flexibility and reducing the environmental impact as much as possible. A balance will need to be struck between these objectives and the key criteria of cost effectiveness and value for money to achieve the optimal overall benefit for the long-term development.
Current Capacity Review
From discussions held with NGT Transco, it is anticipated that there is sufficient capacity within the existing gas infrastructure network to support the levels of development likely to be delivered under the AAF. However it should be noted that no safeguarding of the supply is in place to ensure capacity is reserved for any future development.

Regardless of any safeguarding issues, large scale local infrastructure both new and upgrading of the existing may still be required. New low pressure local distribution mains and associated pressure reducing stations will be required to deliver the supply to any developments.

The level and extent of the new infrastructure will be dependant upon the level and speed of development build out and also the location of key development sites. However, local Network improvements are often required for new developments and this imposition is not considered onerous.

WATER
As discussed earlier, London suffers from a shortage of potable water. Although primary infrastructure operated by Thames Water is in place and as such Leaside is relatively well served, the actual amount of water that can be delivered is constrained by off site generation.

In order to limit future demand it is proposed that serious consideration is given to imposing water reducing measures such as metering, water efficient appliances and flow controllers. In addition consideration should be given to introducing rain water harvesting and grey water recycling initiatives for larger scale developments.

DRAINAGE
Leaside predominantly falls into the catchment area of the Lower Lea Valley and as such has a combined drainage system, where by both foul and surface water are collected into combined sewers and taken to Abbey mills pumping station where the sewerage is pumped up into the Northern outfall sewer and taken to Beckton sewerage treatment works for processing.

As discussed previously, Beckton, Abbey Mills and the Northern outfall sewer are currently at or close to capacity. During peak storm events which occur several times a month during the winter period, a combined storm overflow which is located at Wick Lane discharges into the river network to alleviate pressure on the main drainage infrastructure.

Future Demand
From discussions with Thames Water it is apparent that there is very limited spare capacity within the existing network. Although Thames Water is considering a number of both local and regional initiatives to alleviate the situation, including screening plant at Wick Lane and Abbey Mills, and London wide schemes such as the Thames tideway tunnel and a desalination plant at Beckton, a more strategic approach is favoured by the Environment Agency.
During discussions held with both the Environment Agency and Thames Water for the Olympic and Regeneration schemes it has been agreed that the only feasible approach is to segregate the surface water and foul flows into separate systems for new developments.

In this way, removing the surface water flows from the network increases the spare capacity within the system to enable it to carry additional foul flows. The down side of this approach is that a new means of dealing with the surface water needs to be adopted. This can either be achieved by constructing an entirely new surface water drainage network to carry the run-off to Beckton. This approach will be unlikely to be delivered due to the prohibitive costs associated with new infrastructure. The alternative is to deal with the water locally through attenuation and direct discharge to the local river system. This could be in the form of retention tanks, attenuation ponds or porous pavements.

The exact solution will need to be addressed by future developers but an overall strategy should be established.

**TELECOMS**

Due to the proximity of Leaside to Canary Wharf, one of the largest telecoms exchanges in Europe, there are no anticipated problems with catering for any future demand.

As discussed previously there is currently an issue with parts of Leaside not receiving broadband coverage. However this is due to be addressed in the near future by a roll out plan being implemented by BT.

Therefore aside from minor local extensions and small scale local exchanges there is not perceived to be any issues associated with providing a resilient 21st century telecoms network for Leaside.
10. City fringe utility infrastructure

INTRODUCTION

City Fringe is currently very developed being located to the eastern boundary of the “City” and in close proximity to large transport hubs at Fenchurch Street and Liverpool Street as such the area is well served by all major primary utility infrastructures.

The UDP states that the City Fringe AAF area should cater for an additional 30,000 jobs and 1,500 new residential units. Development within City Fringe is likely to be concentrated around key specific sites and involving re-development of existing sites or potentially refurbishment of existing buildings. One of the challenges of re-developing areas of City Fringe is in maintaining the urban fabric. This imposes special circumstances for the provision of utilities and infrastructure. Wholesale new infrastructure would be prohibitive in cost terms due to the existing urban grain.

Further development capacity

As with any area identified for re-development, the densification of existing areas and the creation of new areas of development will impose an increase demand on utility supply.

ELECTRICITY

Due to the areas close proximity to the “City” the existing infrastructure is very robust, although no specific information is available about spare capacity at individual sub-stations. However, the nature of utility providers business demands mean that there is unlikely to be sufficient spare capacity to cater for the level of re-development identified in the UDP. Therefore upgrading of the existing sub-stations will be required in a timely fashion to support development.

The pre-dominant increase will be due to the creation of 30,000 new jobs in the area. Since peak electricity demand occurs during the evening from predominantly residential users and a very large number of jobs are already supported by the “City”, it is not envisaged that there will be any major primary infrastructure improvements required.
GAS
Similar to electricity, peak demand for gas is generated from heavy industry and residential supply. Since there are not a significant number of new residential units (only 1,500) proposed for City Fringe and the probability that most of the jobs created will be in the service sector or small studio/commercial units, the increased demand for gas supply is not forecast to be large. This will obviously need to be reviewed once more specific information becomes available. However, it is considered that the existing infrastructure, coupled with general routine upgrades, will provide a sufficiently robust network to support the proposals of the AAF. Some local upgrades including local pressure reducing stations may be required to support some of the larger site specific developments.

WATER
Again due to the nature of the proposed areas of growth, namely increased jobs, the future demand on potable water is not envisaged as being significant. Water consumption is predominantly due to domestic residence through the use of washing, bathing, gardening etc. As the number of new residential units proposed is relatively low (only 1,500), so will be the increase demand for potable water. As with gas it is unlikely that any major infrastructure improvements will be required. However due cognisance to the general potable water shortage in London this should be addressed through water reducing measures. Discussion will be required with Thames Water to ensure planned improvements to supplies can be provided through to the existing network.

DRAINAGE
From the information currently obtained from the borough GIS database, we are not able to ascertain the type of drainage network provided in City Fringe. However, since this area of East London is predominantly served by the Northern Outfall Sewer and in turn the sewerage treatment plant in Beckton, it is likely that the primary infrastructure will be a combined system and therefore similar issues to those identified for Leaside will apply, the existing primary infrastructure will be at, or close to capacity.

Unlike Leaside separating the foul and surface flows will be more difficult, in part due to the urban grain and primarily due to the lack of apparent watercourses in the area. More detailed research needs to be undertaken to determine the extent of any culverted sub-terranean water courses that exist in the area.

Due to the nature of existing development within the City Fringe area, there is unlikely to be a significant increase in the amount of impervious surfacing therefore the increase in additional surface water being discharged into the existing network is unlikely to increase (potential changes due to climatic changes aside). The proposed increase in employment numbers and some residential units will mean that foul discharge flows will increase. In order to accommodate this increase within the combined network, some reduction in surface flows will be required. Consideration will therefore need to be given to reducing or attenuating the amount of surface water discharged. Schemes such as rainwater harvesting, water features with soakaways and green roofs should be promoted.
It must be emphasised that this is more of an issue for development in the north of City Fringe as surface water drainage network for the southern half could be developed which could have controlled discharge into the Thames.

TELECOMS
Due to the proximately of the City Fringe area to the ‘Square Mile’ primary telecoms infrastructure is not considered to be an issue. The likely growth in demand from the City is going to require routine upgrades periodically anyway and as such any additional demand from the regeneration of the City Fringe should readily be absorbed in the future enhancement required to support the “City”.

On a more local level, depending on specific development demand, new local infrastructure and possible exchanges may be required.
11. Isle of Dogs Utility Infrastructure

**INTRODUCTION**

The Isle of Dogs has been the focus of extensive regeneration in recent years with large scale re-development focused around Canary Wharf and the Docklands Light Railway and more recently the Millennium Quarter. As such major new primary infrastructure has been installed to support these developments. Canary Wharf being a financial trading hub has required the installation of modern, robust and secure infrastructure, telecoms and electricity. Due to the early identification of the Isle of Dogs as a regeneration area, unlike other areas of London, some resilience and redundancy has already been built in, to facilitate future development.

Although some future proofing has been incorporated, due to commercial pressure, it is unlikely that sufficient redundancy has been provided to support the level of development identified in the AAF. In addition, due to the nature of the site and the severance of the site by the docks, routing of utilities is difficult and any major development is likely to require new utility tunnels under the docks to provide North-South links, especially as the current crossing at Wood Wharf is at capacity.

The 100,000 - 150,000 new jobs identified for the Isle of Dogs is considerable, and no amount of future proofing could be expected to provide this level of redundancy. Due to the nature of the Isle of Dogs the new jobs created could be in a number of different industries; financial services, support sector, retail etc. Future capacity enhancements will vary considerably depending on the modal split of the jobs. If the majority of the jobs occur in the financial services sector then it is reasonable to expect similar developments to Canary Wharf. This will impose a huge demand on Electricity & Telecoms and substantial upgrades will be required.

**ELECTRICITY**

The level of Commercial development proposed means that there is a likely requirement for an additional 50-100MW of electricity in this area. This is a substantial demand and will probably require new sub-stations. Although the primary infrastructure is understood to be in place to supply the development, additional power generation will be required. This could be in the form of a new primary sub-station, or more likely due to the probable phasing, a series of smaller more local sub-stations will be required. Similarly a number of secondary sub-stations will be required to support residential and other developments.
GAS
Similar to the position in respect of electricity, the primary gas infrastructure has been supplied to the Isle of Dogs. Again, due to the level of proposed development there will not be sufficient redundancy in the system. Unlike electricity, it is believed there will not be the need for additional generation as the system has sufficient pressure to support this level of development. What will be required is the extension of the local infrastructure and low pressure mains to the development, including pressure reducing mains.

It should be noted that Gas volumes for new developments are very difficult to calculate at this early stage, since unlike power, some types of development are gas hungry whilst others require no gas at all.

As a typical example one can consider two types of residential development. One instance could have gas central heating and cooking whilst in another heating and cooking could be electric thus eliminating the need for gas entirely. More accurate calculations will need to be undertaken once more specific details are available.

WATER
Similar to the other areas covered by AAF’s future capacity is limited and therefore any future development will have to give due consideration to water reducing measures. However, in addition, there are currently issues in the south of the Isle of Dogs with low pressure being experienced due to the demand taken by Canary Wharf. This will need to be addressed by any future development. One possible option is the scheme tabled by Thames Water during the construction of Canary Wharf, which was the Coppermills to Canary Wharf upgrade link. At the time (early 1980s), the estimated cost of this scheme was in the order if £12 million.

DRAINAGE
Due to the level of development proposed some new infrastructure is inevitable. The limited information available about the type of development means that ascertaining future capacity is difficult. However, as with other areas in East London, the limiting factor is not the local infrastructure but the primary network that is at capacity. In common with Leaside and City Fringe there will be the need to separate the foul and surface flows for any new development.

Unlike City Fringe, the Isle of Dogs is situated close to the Thames and should not have any major problems associated with site attenuation and discharging to local watercourses.

The existing Canary Wharf development has adopted a similar approach where nearly all the surface water is discharges into the docks.
TELECOMS

The Isle of Dogs is very well served by telecoms. Canary Wharf is a financial trading hub, and major telecoms infrastructure has been provided with one of the largest telecom exchanges in Europe being located East of Canary Wharf close to Blackwall Basin. The future capacity of the exchange will be dependant on take up in other areas, especially the regeneration of the Lea Valley. It will also be largely dependant on the type of commercial development that is constructed.

A more detailed analysis of the telecoms requirements will need to be undertaken once more defined proposals are available. At this stage the potential for major telecoms upgrading cannot be discounted. Especially if as alluded to earlier, the majority of the financial services sector.
12. energy options

INTRODUCTION

The Mayor’s “Green Light for Clean Power” document published on 8 March 2004 has confirmed and formalised the requirements for delivering sustainable energy systems for London. The proposals had originally been put forward in draft form as part of The London Plan, which has advocated wide ranging sustainable initiatives in the capital. There is now a firm commitment to delivering environmentally responsible energy solutions for projects and Combined Heat and Power (CHP) is one of the cornerstones of this policy.

CHP is effectively an engine coupled to a generator that burns fuel to produce electricity, a bi-product of this process is heat. Therefore any development supported by a CHP plant will receive both electricity and hot water. This hot water can be used to provide both domestic and commercial supply along with heating. Should the need arise the system can also provide cooling via the installation of local heat exchanges.

CHP can be configured in different ways depending on the input sources available and the energy outputs required. In this paper CHP refers to plants delivering both heating and power outputs. CCHP plants deliver cooling, heating and power, and are alternatively referred to as Trigeneration plants.

CHP plants have been shown to have significant advantages over the conventional remotely generated electricity and heating from individual boiler plants. Trigeneration delivers overall efficiencies in the order of 84% compared with less than 30% for electricity and 75% for gas fired stand alone heating boilers. This translates into a 30% reduction in CO2 emissions for the equivalent energy output.

There are a number of ways in which the CHP systems can be implemented, and a range of fuel inputs from traditional fossil fuels to fully renewable resources. This section sets out the various options that may be applicable to the provision of energy to support the AFF’s and ensure compliance with the London Plan.

The three system options which may be considered are:

- Option 1  A large centrally located plant
- Option 2  A number of smaller regional plants that may be trigeneration or more likely, straightforward CHP
- Option 3  Small scale and micro-CHP plants in individual building development parcels or even individual houses
OPTION 1 – SINGLE LARGE SCALE TRIGENERATION PLANT

Location
For maximum efficiency, this would need to be located at the “centre of
gravity” of the load. If the plant services customers from a number of
Boroughs, the plant itself may not be in the Borough, with only distribution
mains located within the Borough itself.

Size of Plant
The size of the CHP plant would be dependent upon the base load required
and the level of development it would be required to support. The plant
building itself would likely require an area of 160m x 40m and would be 6m
to 8m high, with a flue stack in the order of 50m high. The flue height would
depend on a number of factors, one of which would be the proximity to
adjacent buildings.

System Arrangement
Although the plant has a large output capacity, it would be built up of a
number of modules. This arrangement provides the flexibility to install the
modules as the load builds up over a period of years. This also provides the
necessary resilience in the system, allowing modules to be taken offline for
routine maintenance or in the event of a fault.

The system arrangement is also dependant on the load profile of the
development it is serving and the ratio of electrical load to heating load. A
comparative table of the type of plant and their energy balance is given in a
summary table at the end of this section. The main advantages and
disadvantages are also listed.

OPTION 2 & 3 – SMALL SCALE AND MICRO CHP

Location
For this option, the plant will be included within the building or group of
buildings that the plant serves. This type of system is well suited to buildings
which have good base load heating or cooling and electricity demand
throughout the year. Typical examples would be leisure centres with pools,
hotels and apartment blocks. In the case of micro CHP, the plant may serve
an individual house or dwelling unit.

Plant Type
The plant at this end of the scale would typically take up as much space as a
domestic garage, but could be small enough to fit into a garden shed or small
store room in the case of micro CHP.
System Arrangement

Even at this scale the individual plants could be linked together where they serve a group of buildings such as a housing estate, but it is much more likely that they would be arranged as island sites. In this case the resilience would be provided by a connection to the local electricity distribution network and stand alone hot water boilers. In some cases, surplus electricity may be sold back to the supply authority, but the price per kWh is currently so low that this is not presently economically viable.

Micro CHP plants are relatively new to the market and are designed for domestic scale electricity and heating demand. As such, cooling is not a requirement.

Deliverability

Each of the system arrangements described above presents different opportunities and constraints in respect of deliverability. Only generic statements can be made at this stage as there are so many interrelated issues which are yet to be sufficiently developed. These include construction sequence, economic models, land ownership, grant availability, legislation and overarching development strategies for the valley.

In general, the primary constraints for the large scale CHP and CCHP systems will be the high capital cost, source of funding, large land take, planning issues and environmental impact.

There is potential that the large capital cost and funding demands may prove to be too high, and one of the smaller scale options may be more economically viable. Smaller scale regional CHP systems would be developed locally to the area that they serve and could be built up in modules to match the load growth of the surrounding development.

The capital cost will be far lower, but the source of funding would still have to be carefully considered and controlled. This could be tied to a development strategy which would be binding on all developers within the designated area and may be imposed via Section 106 agreements to fund individual modules of the CHP plant. Other environmental impacts will all be proportionally smaller and easier to manage.

CCHP, DISTRICT HEATING AND DISTRICT COOLING

If a large scale Combined Cooling, Heating and Power (CCHP) scheme is to be adopted to support development such as in the Olympic scenario, then the scheme would be modular to allow its capacity to grow in line with development demand.

There is the potential to combine with other facilities, such as a waste management centre such that the design could allow for the use of different fuels. The most likely initial fuel would be natural gas, which is not a renewable resource but will still allow for a significant contribution to reducing carbon dioxide (CO2) levels. As methane production and other fuels become available from other sources, then the CHP plant will be truly “green” by using a renewable fuel source, significantly reducing net CO2 emissions into the atmosphere further.
It should be noted that a large scale Combined Cooling, Heating and Power (CCHP) has been “committed” for the Stratford City Chelsfield development. It is recommended that this 20MW natural gas fuelled scheme be absorbed into the Lea Valley Ecology Park to provide maximum efficiency and economy under the Olympic scenario, and, so that it can be fuelled from a renewable source as the sewage treatment plant and waste management centres come on line. In addition, any energy demand for Leaside could also potentially be included.

A large, modularised Combined Cooling, Heating and Power (CCHP) plant will reduce primary energy consumption, operating costs and CO2 emissions, and is aligned to the sustainability objectives of the GLA. These energy and greenhouse gas savings will be achieved by the CCHP scheme through its reduction of grid electricity. In addition, the CCHP supplies heat and chilled water to the areas of the development, which increases the overall scheme efficiency and thus reduce the amount of fuel and electricity that would otherwise be consumed for these services.

A district heating and cooling scheme could also be provided. CCHP plant will provide the base load for heating and cooling (via absorption chillers), with peak loads being supported via conventional boilers and chillers for economy. A central plant system will provide significant efficiency savings over having local boiler and chiller systems within commercial or housing developments.

Thermal distribution systems can circulate both medium temperature hot water and chilled water to all buildings within the development. Via “satellite” heat exchanger and secondary pump stations, all building plots could be provided with a valve heat connection point and commercial buildings could be provided with a chilled water main connection point. The hydraulic design of the distribution systems and the supplementary boilers and chillers of the CCHP plant will be such that security of supply will be as good as, or better than conventional means of energy supply.

The following figure indicates how a CHP scheme is typically 84% efficient compared to the 56% total efficiency providing electricity from the national grid and traditional boiler technology for building heating circuits. Thus CO2 emissions are reduced by approximately 30% when comparing CHP to normal energy sources. Net CO2 savings will be nearer 70% when renewable fuels are used in conjunction with CHP, e.g. methane.

A key consideration for all the systems will be how the energy strategy is implemented and managed. There are essentially two models which need to be evaluated.
### SUMMARY OF VARIOUS TYPES OF TRIGENERATION PLANT

<table>
<thead>
<tr>
<th>CCHP Type</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Energy Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Turbine</td>
<td>Potential operational flexibility in heat-to-power ratio</td>
<td>Limited number of unit sizes within output range</td>
<td>Heat recovery 45.1%</td>
</tr>
<tr>
<td></td>
<td>High reliability permitting long term unattended operation</td>
<td>Lower mechanical efficiency than reciprocating engines</td>
<td>Electricity 27.1%</td>
</tr>
<tr>
<td></td>
<td>High grade heat provided</td>
<td>Requires high pressure gas supply, probably via on site gas boosters</td>
<td>Stack loss 22.9%</td>
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<tr>
<td></td>
<td>Constant high speed enabling close frequency control of electrical output</td>
<td>High noise levels</td>
<td>Other losses 4.9%</td>
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<tr>
<td></td>
<td>High power-to-weight ratio</td>
<td>Poor efficiency at low loadings</td>
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<tr>
<td></td>
<td>Low cooling water requirement</td>
<td></td>
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<td></td>
<td>Low foundation loads</td>
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</tr>
<tr>
<td>Reciprocating Engine</td>
<td>High power efficiency, achievable over a wide load range</td>
<td>Must be cooled even if the heat recovered is not reusable</td>
<td>Heat recovery 18.1%</td>
</tr>
<tr>
<td>(Compression Ignition)</td>
<td>Wide range of unit sizes</td>
<td>A large proportion of the heat output is low or medium grade heat from the</td>
<td>Heat recovery 18.1%</td>
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<td></td>
<td></td>
<td>jacket and lubrication oil cooling</td>
<td>High grade</td>
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<td></td>
<td></td>
<td>Low power-to-weight ratio and out of balance forces requiring substantial</td>
<td>Electricity 35.2%</td>
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<td></td>
<td></td>
<td>foundations</td>
<td>Stack loss 20.8%</td>
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<td></td>
<td></td>
<td></td>
<td>Other losses 8%</td>
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<tr>
<td>Reciprocating Engine</td>
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<td></td>
<td>Heat recovery 43.5%</td>
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<tr>
<td>(Spark Ignition)</td>
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<td></td>
<td>Electricity 34.8%</td>
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<td></td>
<td></td>
<td></td>
<td>Stack loss 16.9%</td>
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<td></td>
<td></td>
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<td>Other losses 4.8%</td>
</tr>
</tbody>
</table>

### TOWER HAMLETS ENERGY

#### Current schemes

A small CHP scheme already operates within Tower Hamlets, the Barkingtine scheme, is a 1.4MW electric CHP scheme that services the primarily residential development in the Isle of Dogs.

#### Future prospects

The LB Tower Hamlets is currently one a group of Boroughs supporting the London Community Heating Study (sponsored by the GLA). This study is investigating the feasibility of providing a heat main into the Borough from the Barking Power Station, thereby making use of the major by-product of electricity generation – heat.
POSSIBLE SOLUTIONS TO SUPPORT THE AAFS

Leaside

Leaside is possibly the easiest to consider due to the extensive work already undertaken as part of the Olympic and Regeneration Strategy work streams. In short it is recommended that whatever solution is adopted for either the Olympics or in the event of an unsuccessful bid the Regeneration Strategy should be expanded to include sufficient capacity to support development in Leaside.

City Fringe

City Fringe due to its location and probable high land values does not lend itself to a large scale central plant. Also new development is likely to be more disparate than for the Isle of Dogs. However local or individual development specific CHP should be considered for new development rather than reliance on the grid.

Isle of Dogs

Due to the likely proposals for the Isle of Dogs and relatively high density residential and commercial uses proposed, there are a number of possible solutions available. Large scale central plant would obviously be the most economic and environment friendly in terms of emissions, however due to the potentially high up front costs and energy supply contracts, it might be more favourable to implement 2 or 3 smaller district schemes that are brought on board to support large development areas such as the Millennium Quarter.
appendices

FIGURE 1 STUDY AREAS
FIGURE 2 TRANSPORT NETWORK
FIGURE 3 EXISTING PARKING STRATEGY
FIGURE 4 PROPOSED PARKING STRATEGY
FIGURE 5 BUS ROUTES
FIGURE 6 RAIL ROUTES
FIGURE 7 RAIL/BUS IMPROVEMENTS
FIGURE 8 RAIL STATIONS – ACCESSIBILITY IMPLEMENTATION
FIGURE 9 BOROUGH SPENDING PLAN SCHEMES (2005/06)
Figure 3 Existing Parking Strategy

Key:
- Zone A Bethnal Green Area
- Zone B Bow/Poplar Area
- Zone C Stepney/Wapping Area
- Zone D Isle of Dogs

Night ban on lorry parking:
- Midnight to 6:00am and 6:30pm to Midnight

General yellow line restrictions:
- Monday to Friday 8:30am to 5:30pm with additional weekend restrictions in specific areas

London Arena:
- Extended residents parking hours will apply at additional times during special events
Figure 7 Rail/Bus improvements

- Increase frequency of Central Line by 6 trains per hour
- Increase length of DLR trains from 2 car to 3 cars
- Introduced East London Line, offering line capacity of 7,700 passengers/hour
- Increase frequency of Jubilee Line by 6 trains per hour and increase the length of the trains from 5 cars to 7 cars
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